DSM-IV and DSM-5 alcohol use disorder among young Swiss men

Mohler-Kuo, Meichun ; Foster, Simon ; Gmel, Gerhard ; Dey, Michelle ; Dermota, Petra

Abstract: BACKGROUND AND AIMS: Previous studies suggest that the new DSM-5 criteria for alcohol use disorder (AUD) will increase the apparent prevalence of AUD. This study estimates the 12-month prevalence of AUD using both DSM-IV and DSM-5 criteria and compares the characteristics of men in a high risk sample who meet both, only one and neither sets of diagnostic criteria. DESIGN, SETTING AND PARTICIPANTS: 5943 Swiss men aged 18-25 years who participated in the Cohort Study on Substance Use Risk Factors (C-SURF), a population-based cohort study recruited from three of the six military recruitment centres in Switzerland (response rate = 79.2%). MEASUREMENTS: DSM-IV and DSM-5 criteria, alcohol use patterns, and other substance use were assessed. FINDINGS: Approximately 31.7% (30.5-32.8) of individuals met DSM-5 AUD criteria [21.2% mild (20.1-22.2); 10.5% moderate/severe (9.7-11.3)], which was less than the total rate when DSM-IV criteria for alcohol abuse (AA) and alcohol dependence (AD) were combined [36.8% overall (35.5-37.9); 26.6% AA (25.4-27.7); 10.2% AD (9.4-10.9)]. Of 2479 respondents meeting criteria for either diagnoses, 1585 (63.9%) met criteria for both. For those meeting DSM-IV criteria only (n = 598, 24.1%), hazardous use was most prevalent, whereas the criteria larger/longer use than intended and tolerance to alcohol were most prevalent for respondents meeting DSM-5 criteria only (n = 296, 11.9%). Two in five DSM-IV alcohol abuse cases and one-third of DSM-5 mild AUD individuals fulfilled the diagnostic criteria due to the hazardous use criterion. The addition of the craving and excluding of legal criterion, respectively, did not affect estimated AUD prevalence. CONCLUSIONS: In a high-risk sample of young Swiss males, prevalence of alcohol use disorder as diagnosed by DSM-5 was slightly lower than prevalence of DSM-IV diagnosis of dependence plus abuse; 63.9% of those who met either criterion met criteria for both.

DOI: https://doi.org/10.1111/add.12800

Title: DSM-IV and DSM-5 alcohol use disorder among young Swiss men

Running title: Alcohol use disorder among young men

Authors:

Meichun Mohler-Kuo[1], Simon Foster[1], Gerhard Gmel[2], Michelle Dey[1], Petra Dermota[1]

Affiliation:

[1] Institute of Social and Preventive Medicine, University of Zurich, Switzerland

[2] Alcohol Treatment Centre, Lausanne University Hospital CHUV, Lausanne, Switzerland

Correspondence to:

Meichun Mohler-Kuo
Epidemiology, Biostatistics and Prevention Institute
University of Zurich
Hirschengraben 84
8001 Zürich
Phone: +41 44 634 4637
E-mail: meichun.mohler-kuo@uzh.ch

Key words: Young men, Alcohol Use Disorder, Alcohol Abuse and Dependence, DSM-IV, DSM-5

Conflicts of interest: The authors declare that they have no conflicts of interest.

Word count: 3748

Abstract: 250

ABSTRACT

Background and aims: Prior studies suggest that the new DSM-5 criteria for alcohol use disorder (AUD) will increase the apparent prevalence of AUD. This study estimates the 12-month prevalence of AUD) using both DSM-IV and DSM-5 criteria~~;~~ and compares the characteristics of men in a high risk sample who meet both, only one and neither sets of diagnostic criteria.
Design, setting and participants: ~~-~~5,943 Swiss men age 18 to 25 years who participated in the Cohort Study on Substance Use Risk Factors (C-SURF) a population-based cohort study recruited from three of the six military recruitment centers in Switzerland (response rate=79.2%),. [This section needs more details: current wording doesn't convey anything about design or setting and the information on participants information is a bit sketchy.]
Measurements: DSM-IV and DSM-5 criteria, alcohol use patterns, and other substance use were assessed.
Findings: Approximately 31.7% [30.5-32.8] of individuals met DSM-5 AUD criteria (21.2% moderate [20.1-22.2]; 10.5% severe [9.7-11.3]), which was less than the total rate when DSM-IV criteria for alcohol abuse [AA] and alcohol dependence [AD] were combined (36.8% overall [35.5-37.9]; 26.6% AA [25.4-27.7]; 10.2% AD [9.4-10.9]). Of 2479 respondents meeting criteria for either diagnoses, 1585 (63.9%) met criteria for both. For those meeting DSM-IV criteria only (n=598, 24.1%), *hazardous use* was most prevalent, whereas the criteria *larger/longer use than intended* and *tolerance to alcohol* were most prevalent for respondents meeting DSM-5 criteria only (n=296, 11.9%). Two in three DSM-IV alcohol abuse cases and one third~~s~~ of DSM-5 moderate AUD individuals fulfilled the diagnostic criteria due to the *hazardous use* criterion. The addition of the *craving* and excluding of *legal* criterion, respectively, did not affect estimated AUD prevalence.
Conclusions: In a high-risk sample of young Swiss males, prevalence of alcohol use disorder as diagnosed by DSM-5 was slightly lower than prevalence of DSM-IV diagnosis of dependence plus abuse. 63.9% of those who met either criterion met criteria for both.

INTRODUCTION

Contrary to clinical experience, epidemiological studies using the Fourth Edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) consistently yield higher prevalence estimates for alcohol abuse (AA) and dependence (AD) among men in their twenties than in other general population groups(1-6). However, most of these studies were conducted in the US, and there are considerable differences in drinking patterns between the US and most European countries(7). For example, the legal minimum drinking age in Switzerland is 16, versus 21 in the US. And, whereas alcohol use and heavy drinking increase steadily in Americans until roughly age 21 before leveling off or decreasing (1,8, 9), the exact opposite is observed in most of Europe(10-12).

The fifth edition of the DSM (DSM-5) was released in May 2013, with changes made in the criteria for alcohol use disorders (AUD) for several reasons. First, the DSM-IV criteria were based upon a biaxial hierarchical system, with AD and AA defined as different substance-related problems. However, research indicates that, rather than being distinct, AA and AD represent a continuum of AUD severity, with AA and AD items typically loaded onto one (13-17) or two highly-correlated factors(18). Furthermore, the adequacy of DSM-IV's diagnostic coverage of individuals with alcohol-related problems has been questioned because of its '*diagnostic orphans'* — individuals with one or two dependence symptoms but no DSM-IV AUD. Taking these findings into consideration, the main change made to the AUD criteria in DSM-5 was combining AD and AA into a single disorder. Secondly, new diagnostic thresholds were defined, including ≥ 2 criteria for moderate AUD and ≥ 4 criteria for severe AUD. Thirdly, the AA criterion *legal problems* was removed (because of its low prevalence and poor discriminatory power); and fourthly, a new criterion *craving* was added (as a core characteristic of AUD associated with high severity and good discriminatory power)(13, 14). Otherwise, the DSM-IV and DSM-5 AUD criteria are identical.

DSM criteria for AUD were developed mainly from clinical observations and empirical studies on adults, but have also been studied extensively in adolescents and young adults, particularly in the US(4, 19, 20).

Although data generally support the utility of the DSM criteria for AUD among youths, certain criteria - like *tolerance*, *more or longer use than intended (larger/longer),* and *much time spent* – seem more likely met by younger versus older drinkers(1, 19, 21-25). Due to different drinking patterns and other non-drinking-related factors, young adults may interpret the DSM-IV criteria for any AUD differently than older adults, and thereby fall prone to false-positive symptom assignments that decrease diagnostic validity(1, 24, 26, 27). Therefore, it was suggested that criteria like *tolerance* and *larger/longer* warranted re-wording in DSM-5(24, 28), or that a separate diagnostic system for adolescents/young adults is needed(3). Another criterion found to contribute disproportionately to AUD in the general population, but particularly among young males, was *hazardous use* (29). This frequently-occurring criterion and particularly its *drinking and driving* characteristic have been highly controversial, with some supporting its removal in DSM-5 because of its negative association with drinking involvement relative to other DSM-IV AA criteria and its positive relationship with socioeconomic status(30-34). Despite these limitations and suggestions, since no evidence existed that a different set of criteria for youths improved AUD diagnostic accuracy, all the DSM-IV dependence criteria were included in DSM-5(35). Nonetheless, changes in DSM-5 appear to cause some cases of AUD being gained and others lost in young populations.

To date, few have explored the impact of these changes made from DSM-IV to DSM-5 in any population-based sample(36-39). When done, a slight-to-substantial increase has been apparent in the 12-month prevalence of AUD using DSM-5 criteria. However, no one has studied potential effects on prevalence in younger populations. The present study is the first to do so in young men, a population at especially high risk for AUD. Specific study objectives were (1) to estimate the 12-month prevalence of AUD using both sets of criteria; and (2) to characterize and compare those meeting one set of criteria and not the other, versus those meeting both and those meeting neither.

METHODS

Study design

Data were drawn from the *Cohort Study on Substance Use Risk Factors* (C-SURF, approved by the Ethics Committee for Clinical Research at Lausanne University Medical School, protocol number 15/07). Individuals were recruited at three of six centers recruiting men for military service, representing 21 of 26 Swiss cantons. Since all Swiss men must go through this recruitment process to determine their eligibility at roughly age 19, 98% of Swiss males 18-20 years old were eligible for study inclusion. Two weeks after recruitment, the C-SURF research team contacted participants directly. Among the 7,563 who provided informed consent, 5,990 (79.2%) subsequently completed a written questionnaire between September 2010 and March 2012. We excluded 41 participants due to insufficient information to apply the DSM-IV and DSM-5 criteria, and six older than 25, leaving a total sample of 5,943 men (mean age 19.99±1.22; range 18-25; 92.9% 18–21 years old). C-SURF methodology has been described in detail elsewhere (40).

Measures

Consumption of alcohol and other substances

1. DSM-IV and DSM-5 criteria

DSM-IV and DSM-5(41)-based questions were embedded within our questionnaire to screen for AA, AD and AUD over the year preceding the survey (12-month prevalence). We used an adapted version of the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA)(42)(41), as per Knight et al.(43). Both the questionnaire and the two sets of diagnostic criteria for alcohol use disorder (AUD), as per the DSM-IV and DSM-5 classifications, are shown in a supplement. Individuals were further classified into four groups based upon meeting the DSM-IV and/or DSM-5 criteria: ‘both positive’, ‘both negative’, ‘DSM-5 only’ and ‘DSM-IV only’.

2. Drinking patterns

Here we used questions about usual quantity and frequency of alcohol use; and frequency of risky single-occasion drinking (RSOD) defined, per Murgraff et al. (44), as consuming ≥ 6 standard drinks on a single occasion. Standard drinks containing 10-12 grams of pure alcohol were depicted in the questionnaire. 'At-risk volume drinking' was defined as ≥ 21standard drinks/week and 'at-risk RSOD' as doing so at least monthly. Three drinking patterns were defined: 1) *no-risk consumption* (neither at-risk volume nor at-risk RSOD); 2) *at-risk RSOD drinking* or *at-risk volume drinking* only; and 3) *at-risk RSOD and volume drinking*.

3. Other substance use

'At-risk smoking' was defined as daily smoking and 'at-risk cannabis use' as smoking cannabis at least twice weekly. Yes/no questions were asked to detect any use of other illicit drugs over the past 12 months.

Socio-demographic variables

Socio-demographic variables included highest completed level of education, socioeconomic status, residence (rural versus urban), age, linguistic region (German- vs. French-speaking), and living arrangement.

Statistical analysis

Data were analyzed using SPSS-version19.0. Twelve-month prevalence estimates for DSM-IV AA and AD, and DSM-5 AUD were calculated. Cross-tabulations were used to compare DSM-IV and DSM-5 rates, and kappa coefficients calculated to measure the degree of chance-corrected agreement between the DSM-IV and DSM-5 allocations. Multinomial logistic regression was used to compare sociodemographic characteristics and other substance use patterns between the four diagnostic subgroups. "Both DSM-IV and DSM-5 positive" was used as the reference group to compare against "both negative", "DSM-5 only", and "DSM-IV only".

RESULTS

AUD prevalence and diagnostic agreement between the DSM-IV and DSM-5 criteria

Twelve-month prevalence rates for AUD, per DSM-5 and DSM-IV criteria, are presented for the full sample and stratified by region (German versus French-speaking, Table 1). Approximately 31.7% of all individuals met DSM-5 criteria for AUD (≥2 criteria) — 21.2% for moderate AUD and 10.5% for severe AUD. By McNemar's test, these prevalence rates were significantly lower than when DSM-IV criteria were applied ($p<0.001$), yielding an overall prevalence of 36.8% (AA, 26.6%; and AD, 10.2%). Agreement between the DSM-IV (overall AUD) and DSM-5 (AUD) criteria was reasonable across the sample ($\kappa = 0.67$). Among those failing to meet the DSM-5 criteria for AUD, 14.7% were positive for AUD per DSM-IV criteria. Likewise, 15.7% [14.1-17.4] meeting DSM-5 criteria for AUD failed to satisfy DSM-IV criteria for either AA or AD. Considering the two different linguistic regions, the estimated prevalence rates for AUD were 35.3% with the DSM-IV and 33% with the DSM-5 within the German region, versus 37.9% (DSM-IV) and 30.5% (DSM-5) within the French region. A higher percentage of French than German individuals who met the DSM-IV AUD failed to meet the DSM-5 AUD criteria (16.6% vs. 12.3%, P<0.001).

Table 2 presents more detailed information on the DSM-IV and DSM-5 subgroups. Among those who met the DSM-5 criteria for moderate AUD, 23.5% were DSM-IV *diagnostic orphans* (n=296), whereas 67.7% fulfilled the DSM-IV criteria for AA and 8.8% for AD . However, among those who met the criteria for DSM-IV AA, more than one-third (35.5%) failed to meet DSM-5 criteria, about half (53.9%) met the DSM-5 criteria for moderate AUD and 8.2% met the DSM-5 criteria for severe AUD. Concordance between DSM-IV AA and moderate AUD per DSM-5 was higher in the French-speaking than German-speaking region (72.5% vs 61.8%, P <0.0001). In contrast, all individuals with severe AUD per DSM-5 were classified with either DSM-IV AA (20.7%) or DSM-IV AD (79.3%). Similarly, all individuals meeting DSM-IV criteria for AD met the DSM-5 criteria for either severe (81.8%) or moderate (18.2%) AUD. Of those who failed to meet DSM-5's AUD criteria, 1.3% (n=37) met the DSM-IV criteria for AA

because they satisfied the DSM-IV criterion '*legal problems'*. Even though 31.1 % (n=296) of DSM-IV's '*diagnostic orphans'* fulfilled DSM-5criteria for moderate AUD, the overall prevalence of AUD using the DSM-5 criteria was lower than that using DSM-IV, primarily because 35.6% (n=561) of the DSM-IV-diagnosed AA failed to meet the DSM-5 threshold for AUD. By linguistic region, more DSM-IV AA German-speaking than French-speaking individuals met DSM-5 criteria for either moderate or severe AUD (65.5% vs. 59.9%, P<0.001)

Endorsement of DSM AUD criteria

In Table 3, the prevalence of each AUD criterion is presented by diagnostic group, as determined using the DSM-IV and DSM-5 criteria. Overall, rates ranged from 2.8% for the criterion *continued despite problem* to 29.5% for *larger/longer*. The most frequently-endorsed item was *hazardous use* among those subgroups fulfilling DSM-IV AA, DSM-IV criteria only, and the subgroup fulfilling both DSM-IV and DSM-5 criteria. Meanwhile, most commonly-endorsed item for those meeting DSM-IV AD and DSM-5 severe AUD criteria was *larger/longer*. However, *hazardous use* was also frequently-endorsed by DSM-IV AD (61.7%) and DSM-5 severe AUD (78.8%). Of the 296 young men who met the DSM-5 AUD criteria alone, 82.8% endorsed the *larger/longer* and 65.5% the *tolerance* criterion.

Effects of excluding legal problems and adding craving to DSM-5

Approximately 4.7% of individuals (n=279) reported legal problems over the preceding 12 months. Most met ≥ 2 additional criteria; hence, eliminating the *legal* criterion impacted prevalence minimally. Within the DSM-IV classification, only 60 (1.0% of the whole sample or 3.8% of AA cases) received an AA diagnosis because they fulfilled the *legal problem* criterion. Only 36 individuals (0.6%) would have been additionally diagnosed with (moderate) AUD if the *legal problems criterion* remained in DSM-5. Overall, only 3.2% fulfilled the DSM-5 *craving* criteria. Nevertheless, 25.4% of the men meeting DSM-5 criteria for severe AUD and 21.2% meeting DSM-IV criteria for AD reported *craving*. However, the effect of

adding the *craving* criterion was extremely small, leading to an AUD diagnosis in only eight individuals (0.1%, data not shown).

Effects of *hazardous use* criterion

Approximately 60.8% of DSM-IV AA cases (n=959) endorsed only *hazardous use* among four DSM-IV abuse criteria and were assigned their diagnosis based upon this alone (they might also endorsed 0-2 dependence criteria). Applying DSM-5 criteria, 30.9% of those with moderate AUD (n=388) satisfied diagnostic criteria because of the additional *hazardous use* criterion (data not shown).

Sociodemographic profiles by AUD subgroup

Socio-demographic profiles across the four discrepant diagnostic groups are shown in Table 4. Compared to participants fulfilling both sets of criteria, those who only met the DSM-5 criteria were less likely to be over 20-years-old (AOR=0.72, $p <= 0.05$) and from a French-speaking region (AOR=0.68, $p < 0.01$), and more likely to live alone or with a girlfriend ($p<0.05$). On the other hand, those meeting DSM-IV criteria only were more likely to be from French-speaking region (AOR=1.43, $p<0.01$).

Relationship between diagnostic subgroups and drinking correlates/at-risk substance use

Relative to those meeting both DSM-IV and DSM-5 criteria, all other subgroups reported less alcohol and illicit drug use (Table 5). In terms of reporting at-risk tobacco use, only those meeting DSM-IV criteria only and those meeting neither set of criteria were less likely than those meeting both. And for at-risk cannabis use, only those not fulfilling either criteria set and those meeting DSM-5 criteria only were less likely than the both-criteria group.

DISCUSSION

The present study provides an updated prevalence estimate of alcohol use disorder using both DSM-IV and DSM-5 criteria in a large sample of high-risk young men from a European country with high alcohol

consumption(45). Results showed that AUD is highly prevalent in young Swiss men; in fact, one in three fulfilled the criteria for AUD using either the DSM-IV or DSM-5 criteria.

Agreement between the two sets of criteria AUD was reasonable but slightly lower than in previous studies (36-39), suggesting that the two classification systems measure the same underlying construct. Contrary to previous general population research (36-39), the prevalence of AUD among young men showed a relative decrease of 13. 9%: from 36.8% with the DSM-IV criteria to 31.7% with the DSM-5 criteria. *Diagnostic movements* caused by the changes between in DSM-IV and DSM-5 criteria are mainly due to their reassignment from DSM-IV *diagnostic orphans* to DSM-5 moderate AUD and those meeting only one of the four DSM-IV abuse criteria were no longer diagnosed with AUD in DSM-5. In the present study, 598 of 1578 DSM-IV abuse cases (37.9%) failed to satisfy the DSM-5 criteria, while 296 of 953 DSM-IV *diagnostic orphans* (31.1%) were incorporated into the DSM-5 moderate AUD group. The decrease by 13.9% in DSM-5 AUD prevalence is because the former scenario occurred twice as often as the latter (598 vs. 296 cases).

This contrasts with previous studies that showed the opposite, performed using data from the U.S. National Epidemiological Survey of Alcohol and Related Conditions (NESASRC) and the Australian National Survey of Mental Health and Well-Being (NSMHWB)(36-38). About 36.0% of DSM-IV abuse cases from the US NESASRC (37) and 29.3% of DSM-IV abuse cases from the Australian NSMHWB failed to fulfill DSM-5 criteria, which is slightly lower than our rate of 37.9%, despite the higher prevalence identified with DSM-5 than DSM-IV in their studies. On the other hand, 33.1% of DSM-IV *diagnostic orphans* from the Australian NSMHWB satisfied DSM-5 criteria, a percentage comparable to the 31.1% we identified (the rate form the US NESASRC was not shown in their paper). The main reason for the contrary findings, given comparable in congruency rates, is the relatively high prevalence of DSM-IV abuse (26.6%) we found, compared to only 1.9% in Australia and 5.3% in the US. Consequently, much more DSM-IV *diagnostic orphans* were incorporated to DSM-5 than those DSM-IV abuse cases being

excluded. Whereas the 12-month prevalence for AD (10.2%) and severe AUD (10.5%) are comparable to those of other studies on young men ranging between 8.0% and 11.0% DSM-IV AD (4, 25,46), the prevalence of DSM-IV abuse identified in our study is relatively higher than those of other studies using similar age groups. For example, the prevalence of AA was 17.1% among 18-25 years old men from US National Surveys on Drug Use and Health 2002-2005 (4); 10.5% in young men 18-21 year old from Germany (46), and 9.4% in 18-29 young men from US NESARC (8). This difference may be partly explained by the fact that those afore-mentioned studies were conducted more than 10 years ago (e.g. Australian data from 1997 and U.S data from 2004-2005). Therefore, more research is needed to examine to what extend the high prevalence identified in our study can be attributed to regional differences, measurement error, cultural variation or differences in prevalence over time.

The two major criteria changes made in DSM-5 did not greatly affect prevalence rates in the current study: excluding *legal problems* led to only 0.6% of the young men no longer meeting criteria for AUD; and adding *craving* only resulted in a 0.1% increase. As craving has been shown to increase measurement precision only at the higher end of AUD severity(13), and because respondents in general population versus clinic samples generally report less-severe problems(3), the small effect of craving on the prevalence of AUD in our sample was not unexpected, and quite consistent with previous findings(13, 36-38).

Another DSM-5 criteria change was that satisfying two criteria was sufficient to receive an AUD diagnosis. Those meeting only one of the four DSM-IV abuse criteria were no longer diagnosed with AUD applying DSM-5 criteria. The impact is especially pronounced among young adults who were more likely to engage in risk-taking behaviors. As shown in previous study that the prevalence rate of hazardous use decreased with age (29). Consistent with previous research, those who only met DSM-IV abuse criteria were most likely to report *hazardous use,* particularly from *drinking and driving*. The number of such individuals in our study was greater than those incorporated ‘diagnostic orphans’, which led to a

smaller overall prevalence of AUD by DSM-5 versus DSM-IV. Our study supported the premise that the new, revised uni-dimensional DSM-5 AUD with 2+ criteria successfully excluded those individuals diagnosed previously with abuse (using the DSM-IV criteria) who only reported '*hazardous use'*. We excluded 37.8% (n=598) of DSM-IV abuse cases when applying DSM-5 criteria because they met only one of the 4 DSM-IV abuse criteria. Among them, 442 of them (73.9%) were due to *hazardous use* criterion only and additional 17 (2.8%) were excluded because they endorsed both *hazardous use* and legal problem. The present study further revealed that *hazardous use'* is frequently endorsed by other heavier forms of AUD diagnostic subgroup. For example, two thirds of the respondents who met DSM-IV criteria for dependence, and more than three quarters of those who met DSM-5 criteria for severe AUD or satisfying both sets of criteria admitted to *hazardous use.* Despite calls to remove the *hazardous use* criterion in DSM-5 (29, 34), the present support that the likelihood of inflating prevalence due to *hazardous use* was much lower applying the DSM-5 versus DSM-IV classification system

Consistent with other young adult or adolescent studies, the most-commonly met criteria across the whole sample and among those meeting both sets of criteria were *hazardous use, larger/longer,* and *tolerance* (23, 24). Among those meeting DSM-5 criteria only, the most commonly satisfied criteria were *larger/longer* and *tolerance*. This differs from results reported elsewhere on DSM-5 criteria in general populations, where such individuals were most likely to fulfill the *larger/longer* and *quit/control* criteria (37, 39). These young men were less often trying to reduce their drinking, perhaps because young men typically intend to get drunk (24). As indicated by previous research, young adults interpret some DSM-criteria, particularly *larger/longer* and *tolerance*, differently than older adults. The *larger/longer* and *tolerance* criteria also have been shown to differ in severity between different adolescent samples, with those at greatest risk for serious AD less likely to report them(28). Additionally, the high prevalence of *tolerance* may represent a normal developmental phenomenon, rather than a pathological process indicative of dependence: the acquired ability to 'hold one's liquor' when young might not be the same process that allows a chronic heavy drinker to consume copious amounts of alcohol over extended periods

of time(3, 24, 25). Moreover, Pabst et al. demonstrated that 18-24 year-olds were much more likely to report the *tolerance* and *larger/longer* criteria than older respondents, even with differences in drinking behaviour considered (1). Hence, the high prevalence of *tolerance* and *larger/longer* positives in the 'DSM-5 criteria only' group and across our whole sample might not have been associated with alcohol consumption *per se*, but with other factors. Overall, the potentially-different rather than intended interpretations of symptoms with low specificity might have resulted in over-estimation of AUD diagnoses in the present study, especially among those with less severe AUD within both classification systems. That the 'DSM-5 criteria only' and 'DSM-IV criteria only' groups reported similar intermediate levels of drinking and other substance use supports this assumption.

In terms of socio-demographics, we detected no significant differences in AUD between urban and rural regions, which is consistent with data from Norway(47), but not Spain(48). However, there was a significant difference between linguistic regions — individuals from the French (versus German) speaking region of Switzerland were less likely to be in the DSM-5 AUD only subgroup and more likely to be in the DSM-IV AUD only subgroup. In addition, the concordance between DSM-IV abuse and DSM-5 moderate was higher in residents of the French- versus German-speaking region. This can be explained by the high variability in drinking patterns that exists between French- and Germans- speaking regions. Combined with already-documented differences in drinking patterns in Europe versus the US, the present results support the need for global validation of the changes in DSM-5.

Our study was limited in that, versus collecting data in a clinic, using written questionnaires in a general population survey increases the likelihood of AUD misidentification. The less-severe spectrum of problems among respondents in general versus clinical samples also makes it more challenging to assess the true underlying AUD syndrome (3). Moreover, our sample consisted exclusively of young Swiss men; hence, our results cannot be extrapolated to other age groups or women.

These limitations aside, our results suggest that the DSM-5 AUD is an improvement over DSM-IV, in terms of reducing the over-diagnosis of DSM-IV AA especially in young men. Overall, the combination of all eleven AUD criteria into one category in DSM-5 provided lower prevalence estimates and decreased false-positive assignments in young men, relative to the DSM-IV scheme. The concern that not revising individual criteria that are prone to misinterpretation would further inflate already-inaccurate prevalence estimates (34) was unfounded in our high-risk sample. Our findings further support the 11 criteria being considered as one category of DSM-5 AUD. However, the updated high AUD prevalence found in our study suggests that future research is needed to determine whether this high prevalence is due to the new trend, regional differences or measurement error. Certain highly-endorsed criteria — like *larger/longer, tolerance, and hazardous use* — can be examined further to improve question structure and symptom assessments in young adults.

ACKNOWLEDGEMENTS

We are grateful to Charlotte Eidenbenz for project management. This work has been supported by the Swiss National Science Foundation (33CS30_139467).

References

1. Pabst A, Kraus L, Piontek D, Baumeister SE. Age differences in diagnostic criteria of DSM-IV alcohol dependence among adults with similar drinking behaviour. Addiction. 2012 Feb;107(2):331-8.
2. Chung T, Martin CS, Winters KC. Diagnosis, course, and assessment of alcohol abuse and dependence in adolescents. Recent Dev Alcohol. 2005;17:5-27.
3. Caetano R, Babor TF. Diagnosis of alcohol dependence in epidemiological surveys: an epidemic of youthful alcohol dependence or a case of measurement error? Addiction. 2006 Sep;101:111-4.
4. Harford TC, Yi HY, Faden VB, Chen CM. The Dimensionality of DSM-IV Alcohol Use Disorders Among Adolescent and Adult Drinkers and Symptom Patterns by Age, Gender, and Race/Ethnicity. Alcohol Clin Exp Res. 2009 May;33(5):868-78.
5. Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP. The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence - United States, 1991-1992 and 2001-2002 (Reprinted from Drug and Alcohol Dependence, vol 74, pg 223-234, 2004). Alcohol Res Health. 2006;29(2):79-91.
6. Lee HK, Chou SP, Cho MJ, Park JI, Dawson DA, Grant BF. The prevalence and correlates of alcohol use disorders in the United States and Korea-a cross-national comparative study. Alcohol. 2010 Jun;44(4):297-306.
7. Rehm J, Room R, Van Den Brink W, Jacobi F. Alcohol use disorders in EU countries and Norway: An overview of the epidemiology. Eur Neuropsychopharm. 2005 Aug;15(4):377-88
8. Health NIo. Alcohol use and alcohol use disorders in the United States: Main findings from the 2001-2002 national epidemiologic survey on alcohol and related conditions (NESARC) 2006; U.S. Alcohol Epidemiologic Data Reference Manual Volume 8: Available from: http://pubs.niaaa.nih.gov/publications/NESARC_DRM/NESARCDRM.pdf.
9. Muthen BO, Muthen LK. The development of heavy drinking and alcohol-related problems from ages 18 to 37 in a US national sample. J Stud Alcohol. 2000 Mar;61(2):290-300
10. Kraus L, Bloomfield K, Augustin R, Reese A. Prevalence of alcohol use and the association between onset of use and alcohol-related problems in a general population sample in Germany. Addiction. 2000 Sep;95(9):1389-401.
11. Gmel G, Notari L, Georges A, Wicki M. Alkohol, Suchtmonitoring Schweiz / Jahresbericht – Daten 2011. Bern2012.
12. Pabst A, Kraus L, Piontek D, Müller S. Age, period, and cohort effects on time trends in alcohol consumption in the German adult general population. Sucht. 2010;56:349-60.
13. Keyes KM, Krueger RF, Grant BF, Hasin DS. Alcohol craving and the dimensionality of alcohol disorders. Psychological Medicine. 2011 Mar;41(3):629-40.
14. Casey M, Adamson G, Shevlin M, McKinney A. The role of craving in AUDs: Dimensionality and Differential Functioning in the DSM-5. Drug Alcohol Depen. 2012 Sep 1;125(1-2):75-80.
15. Saha TD, Chou SP, Grant BF. Toward an alcohol use disorder continuum using item response theory: results from the National Epidemiologic Survey on Alcohol and Related Conditions. Psychological Medicine. 2006 Jul;36(7):931-41.
16. Hasin DS, Fenton MC, Beseler C, Park JY, Wall MM. Analyses related to the development of DSM-5 criteria for substance use related disorders: 2. Proposed DSM-5 criteria for alcohol, cannabis, cocaine and heroin disorders in 663 substance abuse patients. Drug Alcohol Depen. 2012 Apr 1;122(1-2):28-37.
17. Martin CS, Chung T, Kirisci L, Langenbucher JW. Item response theory analysis of diagnostic criteria for alcohol and cannabis use disorders in adolescents: Implications for DSM-V. Journal of Abnormal Psychology. 2006 Nov;115(4):807-14.
18. Grant BF, Harford TC, Muthen BO, Yi HY, Hasin DS, Stinson FS. DSM-IV alcohol dependence and abuse: Further evidence of validity in the general population. Drug Alcohol Depen. 2007 Jan 12;86(2-3):154-66.
19. Hagman BT, Cohn AM. Toward DSM-V: Mapping the alcohol use disorder continuum in college students. Drug Alcohol Depen. 2011 Nov 1;118(2-3):202-8.

20.Beseler CL, Taylor LA, Leeman RF. An Item-Response Theory Analysis of DSM-IV Alcohol-Use Disorder Criteria and "Binge" Drinking in Undergraduates. J Stud Alcohol Drugs. 2010 May;71(3):418-23.

21.Kilpatrick DG, Acierno R, Saunders B, Resnick HS, Best CL, Schnurr PP. Risk factors for adolescent substance abuse and dependence: Data from a national sample. J Consult Clin Psych. 2000 Feb;68(1):19-30.

22.Young SE, Corley RP, Stallings MC, Rhee SH, Crowley TJ, Hewitt JK. Substance use, abuse and dependence in adolescence: prevalence, symptom profiles and correlates. Drug Alcohol Depen. 2002 Dec 1;68(3):309-22.

23.Chung T, Martin CS, Armstrong TD, Labouvie EW. Prevalence of DSM-IV alcohol diagnoses and symptoms in adolescent community and clinical samples. J Am Acad Child Psy. 2002 May;41(5):546-54.

24.Chung T, Martin CS. What were they thinking? Adolescents' interpretations of DSM-IV alcohol dependence symptom queries and implications for diagnostic validity. Drug Alcohol Depen. 2005 Nov 1;80(2):191-200.

25.Harford TC, Grant BF, Yi HY, Chen CM. Patterns of DSM-IV alcohol abuse and dependence criteria among adolescents and adults: Results from the 2001 National Household Survey on Drug Abuse. Alcohol Clin Exp Res. 2005 May;29(5):810-28.

26.Deas D, Riggs P, Langenbucher J, Goldman M, Brown S. Adolescents are not adults: developmental considerations in alcohol users. Alcohol Clin Exp Res. 2000 Feb;24(2):232-7.

27.Mewton L, Teesson M, Slade T, Grove R. The Epidemiology of DSM-IV Alcohol Use Disorders amongst Young Adults in the Australian Population. Alcohol Alcoholism. 2011 Mar-Apr;46(2):185-91.

28.Gelhorn H, Hartman C, Sakai J, Stallings M, Young S, Rhee SH, et al. Toward DSM-V: An Item Response Theory Analysis of the Diagnostic Process for DSM-IV Alcohol Abuse and Dependence in Adolescents. J Am Acad Child Psy. 2008 Nov;47(11):1329-39.

29.Mewton L, Slade T, Memedovic S, Teesson M. Alcohol Use in Hazardous Situations: Implications for DSM-IV and DSM-5 Alcohol Use Disorders. Alcohol Clin Exp Res. 2013 Jan;37:E228-E36.

30.Hasin D, Paykin A. DSM-IV alcohol abuse: Investigation in a sample of at-risk drinkers in the community. J Stud Alcohol. 1999 Mar;60(2):181-7.

31.Hasin DS, Stinson FS, Ogburn E, Grant BF. Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States - Results from the National Epidemiologic Survey on Alcohol and Related Conditions. Arch Gen Psychiat. 2007 Jul;64(7):830-42.

32.Keyes KM, Hasin DS. Socio-economic status and problem alcohol use: the positive relationship between income and the DSM-IV alcohol abuse diagnosis. Addiction. 2008 Jul;103(7):1120-30.

33.Babor TF, Caetano R. The trouble with alcohol abuse: what are we trying to measure, diagnose, count and prevent? Addiction. 2008 Jul;103(7):1057-9.

34.Babor TF. Substance, Not Semantics, Is the Issue: Comments on the Proposed Addiction Criteria for Dsm-V. Addiction. 2011 May;106(5):870-2.

35.Hasin DS, O'Brien CP, Auriacombe M, Borges G, Bucholz K, Budney A, et al. DSM-5 Criteria for Substance Use Disorders: Recommendations and Rationale. Am J Psychiat. 2013 Aug;170(8):834-51.

36.Mewton L, Slade T, McBride O, Grove R, Teesson M. An evaluation of the proposed DSM-5 alcohol use disorder criteria using Australian national data. Addiction. 2011 May;106(5):941-50.

37.Agrawal A, Heath AC, Lynskey MT. DSM-IV to DSM-5: the impact of proposed revisions on diagnosis of alcohol use disorders. Addiction. 2011 Nov;106(11):1935-43.

38.Dawson DA, Goldstein RB, Grant BF. Differences in the profiles of DSM-IV and DSM-5 alcohol use disorders: implications for clinicians. Alcohol Clin Exp Res. 2013 Jan;37 Suppl 1:E305-13.

39.Edwards AC, Gillespie NA, Aggen SH, Kendler KS. Assessment of a Modified DSM-5 Diagnosis of Alcohol Use Disorder in a Genetically Informative Population. Alcohol Clin Exp Res. 2013 Mar;37(3):443-51.

40.Studer J, Baggio S, Mohler-Kuo M, Dermota P, Gaume J, Bertholet N, et al. Examining non-response bias in substance use research-Are late respondents proxies for non-respondents? Drug Alcohol Depen. 2013 Sep 1;132(1-2):316-23.

41.American, Psychiatric, Association. Diagnostic and Statistical Manual of Mental Disorders TR. 4th Text Revision ed. Washington, DC: American Psychiatric Association; 2000.

42.Hesselbrock M, Easton C, Bucholz KK, Schuckit M, Hesselbrock V. A validity study of the SSAGA - a comparison with the SCAN. Addiction. 1999 Sep;94(9):1361-70.

43.Knight JR, Wechsler H, Kuo MC, Seibring M, Weitzman ER, Schuckit MA. Alcohol abuse and dependence among US college students. J Stud Alcohol. 2002 May;63(3):263-70.

44.Murgraff V, Parrott A, Bennett P. Risky single-occasion drinking amongst young people - Definition, correlates, policy, and intervention: A broad overview of research findings. Alcohol Alcoholism. 1999 Jan-Feb;34(1):3-14.

45. World Health Organization . The global status report on alcohol and health 2014. Geneva (http://www.who.int/substance_abuse/publications/global_alcohol_report/en/ , accessed 12 August 2014).

46.Nelson CB, Wittchen HU. DSM-IV alcohol disorders in a general population sample of adolescents and young adults. Addiction. 1998 Jul;93(7):1065-77.

47.Kringlen E, Torgersen S, Cramer V. A Norwegian psychiatric epidemiological study. Am J Psychiat. 2001 Jul;158(7):1091-8.

48.Mateos R, Paramo M, Carrera I, Rodriguez-Lopez A. Alcohol consumption in a Southern European region (Galicia, Spain). Subst Use Misuse. 2002;37(14):1957-76.

Table 1: 12-month prevalence of alcohol use disorder (AUD) using DSM-5 and DSM-IV criteria, and their diagnostic concordance (Kappa[a])

Total Sample (N=5943)	DSM-5 Diagnosis				
DSM-IV Diagnosis	Positive for AUD 31.7% [30.5-32.8] (n=1,881)		Negative for AUD 68.3% [67.2-69.5] (n=4,062)		
	N	% [95%-CI[b]]	N	% [95%-CI]	Kappa [95%-CI]
Positive for any AUD 36.8% [35.5-37.9] (n=2,183)	1,585	84.3 [82.6-85.9]	598	14.7 [13.6-15.8]	
Negative for any AUD 63.2% [62.0-64.5] (n=3,760)	296	15.7 [14.1-17.4]	3,464	85.3 [84.2-86.4]	0.67 [0.65-0.69]
German-speaking participants (N=2,645)	DSM-5 Diagnosis				
DSM-IV Diagnosis	Positive for AUD 33% [31.3-34.8] (n=874)		Negative for AUD 67% [65.2-68.7] (n=1,771)		
	N	% [95%-CI[b]]	N	% [95%-CI]	Kappa [95%-CI]
Positive for any AUD 35.3% [33.5-37.1] (n=934)	716	81.9 [79.4-84.5]	218	12.3 [10.8-13.8]	
Negative for any AUD 64.7% [62.9-66.5] (n=1,711)	158	18.1 [15.5-20.6]	1,553	87.7 [86.2-89.2]	0.68 [0.67-0.70]
French-speaking participants (N=3,298)	DSM-5 Diagnosis				
DSM-IV Diagnosis	Positive for AUD 30.5% [29.0-32.1] (n=1,007)		Negative for AUD 69.5% [67.9-71.0] (n=2,291)		
	N	% [95%-CI[b]]	N	% [95%-CI]	Kappa [95%-CI]
Positive for any AUD 37.9% [36.2-39.5] (n=1,249)	869	86.3 [84.2-88.4]	380	16.6 [15.1-18.1]	
Negative for any AUD 62.1% [60.5-63.8] (n=2,049)	138	13.7 [11.6-15.8]	1,911	83.4 [81.9-84.9]	0.65 [0.64-0.67]

[a] indicates agreement between DSM-5 alcohol use disorder and DSM-IV any alcohol use disorder. Kappa values > **0.75** have traditionally been considered excellent, from **0.40** to **0.74** indicates fair to good agreement, and below **0.39** indicates poor agreement

[b] 95%-Confidence Interval

Conducted in 2010-2011, part of the Cohort Study on Substance Use Risk Factors (C-SURF) in Switzerland

Table 2: Categorization of specific DSM-IV & DSM-5 diagnostic subgroups of alcohol use disorder (AUD) in young Swiss men (n=5,943)

			DSM-5											
Total sample (n=5,943)	Total		No criteria n=2.838 (47.8%)			1 criterion n=1,224 (20.6%)			Moderate AUD (2-3 criteria) n=1,257 (21.2%)			Severe AUD (≥ 4 criteria) n=624 (10.5%)		
	n	%	n	Column %	Row %	n	Column %	Row %	n	Column %	Row %	n	Column %	Row %
DSM-IV														
No abuse and dependence criteria	2,807	47.2	2,801	98.7	99.8	6	0.5	0.2	0	0	0	0	0	0
Diagnostic orphans[a]	953	16.0	0	0	0	657	53.7	68.9	296	23.5	31.1	0	0	0
Abuse	1,578	26.6	37	1.3	2.3	561	45.8	35.6	851	67.7	53.9	129	20.7	8.2
Dependence	605	10.2	0	0	0	0	0	0	110	8.8	18.2	495	79.3	81.8
			DSM-5											
German-speaking participants (n=2,645)	Total		No criteria n=1,242 (47.0%)			1 criterion n=529 (20.0%)			Moderate AUD (2-3 criteria) n=566 (21.4%)			Severe AUD (≥ 4 criteria) n=308 (11.6%)		
	n	%	n	Column %	Row %	n	Column %	Row %	n	Column %	Row %	n	Column %	Row %
DSM-IV														
No abuse and dependence criteria	1,231	46.5	1,228	98.9	99.8	3	0.6	0.2	0	0	0	0	0	0
Diagnostic orphans[a]	480	18.1	0	0	0	322	60.9	67.1	158	27.9	32.9	0	0	0
Abuse	631	23.9	14	1.1	2.2	204	27.9	32.3	350	61.8	55.5	63	20.5	10.0
Dependence	303	11.5	0	0	0	0	0	0	58	10.2	19.1	245	79.5	80.9
			DSM-5											
French-speaking participants (n=3,298)	Total		No criteria n=1,596 (48.4%)			1 criterion n=695 (21.1%)			Moderate AUD (2-3 criteria) n=691 (21.0%)			Severe AUD (≥ 4 criteria) n=316 (9.6%)		
	n	%	n	Column %	Row %	n	Column %	Row %	n	Column %	Row %	n	Column %	Row %
DSM-IV														
No abuse and dependence criteria	1,576	47.8	1,573	98.6	99.8	3	0.4	0.2	0	0	0	0	0	0
Diagnostic orphans[a]	473	14.3	0	0	0	335	48.2	70.8	138	20.0	29.2	0	0	0
Abuse	947	28.7	23	1.4	2.4	357	51.4	37.7	501	72.5	52.9	66	20.9	7.0
Dependence	302	9.2	0	0	0	0	0	0	52	7.5	17.2	250	79.1	82.8

[a] Individuals who reported at least one but no more than two DSM-IV dependence criteria and no abuse criteria.
[b] Of the 1224 men with one DSM-5 AUD criterion, 36 endorsed legal problems (0.6% of the whole sample)
Conducted in 2010-2011, part of the Cohort Study on Substance Use Risk Factors (C-SURF) in Switzerland

Table 3: 12-month prevalence of alcohol use disorder (AUD), meeting DSM-5 diagnostic criteria, versus both DSM-5 and DSM-IV criteria, both criteria negative, DSM-5 positive only or DSM-IV positive only

	All (n = 5,943)	No DSM-5 diagnosis (n = 4,062)	DSM-IV AA[c] (n = 1,578)	DSM-IV AD[d] (n = 605)	DSM-5 Moderate AUD (n = 1,257)	DSM-5 Severe AUD (n = 624))	Both positive (n = 1,585)	Both negative (n = 3,464)	DSM-5 only (n = 296)	DSM-IV only (n = 598)
Diagnosis of AUD (two or more of the 11 criteria)	31.3	0.0	62.1	100	100	100	100	0.0	100	0.0
Role impairment	11.1	1.8	26.7	39.2	19.6	54.2	36.9	0.0	0.0	12.4
Hazardous Use	27.6	11.3	80.3	61.7	54.8	78.8	74.5	0.0	0.0	76.8
Drinking & driving	21.6	9.6	63.2	41.8	42.2	53.2	54.4	0.0	0.0	65.1
Physical injuries	12.9	2.9	32.0	43.3	24.9	53.8	40.9	0.0	0.0	19.7
Craving (DSM-5 criterion only[a])	3.2	0.1	2.7	21.2	1.9	25.5	10.8	0.2	4.1	0.0
Social problems	4.5	0.3	7.5	24.2	4.2	31.6	15.8	0.0	0.0	2.4
Tolerance	22.0	5.4	25.3	82.6	49.9	73.3	56.2	6.2	65.5	1.3
Withdrawal	4.1	0.2	2.4	28.6	5.2	27.2	13.3	0.3	8.1	0.0
Larger / longer	29.5	9.3	37.1	90.5	67.9	83.6	71.3	10.9	82.8	0.5
Quit / control	3.8	0.3	2.1	28.4	3.4	27.2	12.9	0.3	2.7	0.0
Much time spent	14.7	1.1	14.0	84.1	28.6	76.0	45.9	1.2	35.5	0.2
Activities given up	3.1	0.1	1.8	24.1	1.6	25.5	11.0	0.1	1.7	0.0
Use despite harm	2.8	1.8	1.6	21.2	2.0	21.5	9.6	0.1	2.4	0.3
Legal problems (DSM-IV criterion only[b])	4.7	1.8	10.7	18.4	5.6	21.9	13.0	0.0	0.0	12.3

[a] The frequency of the craving criterion is presented for all subgroups, even though included only in the DSM-5 AUD criteria and not the DSM-IV.
[b] The frequency that the legal problems criterion is met is presented for all subgroups, even though it only is included in the DSM-IV criteria for AUD and not in DSM-5.
[c] Alcohol abuse
[d] Alcohol dependence

Table 4 Sociodemographic characteristics of individuals with DSM-IV or DSM-5 alcohol use disorder (AUD) over the past 12 months, and of those who were both DSM-5 and DSM-IV criteria positive, both negative, DSM-5 positive only, or DSM-IV positive only

	All (n = 5,943)	Both negative (n = 3,464)	Both positive (n = 1,585)	DSM-5 only (n = 296)	DSM-IV only (n = 598)	Both negative vs. Both positive	DSM-5 only vs. Both positive	DSM-IV only vs. Both positive
	Row-%	Row-%	Row-%	Row-%	Row-%	AOR [95% CI] [a]	AOR [95% CI] [a]	AOR [95% CI] [a]
Full sample	100.0	58.3	26.7	5.0	10.0	-	-	-
Age								
< 20 years old	59.3	57.6	26.9	5.7	9.7	1	1	1
≥ 20 years old	40.7	59.3	26.2	4.0	10.5	1.06 [0.93-1.21]	0.72 [0.54-0.96] *	1.05 [0.85-1.28]
Linguistic region								
German	44.5	58.7	27.1	6.0	8.2	1	1	1
French	55.5	57.9	26.3	4.2	11.5	0.97 [0.84-1.10]	0.68 [0.51-0.89] **	1.43 [1.15-1.77] **
Residence								
rural	60.3	57.3	27.5	4.9	10.3	1	1	1
urban	39.7	59.8	25.5	5.1	9.7	1.13 [0.99-1.28]	1.21 [0.93-1.58]	0.96 [0.78-1.17]
Education								
primary school	49.8	58.2	26.7	5.1	10.0	1	1	1
higher vocational school	29.2	57.9	26.7	5.2	10.2	0.99 [0.85-1.14]	1.14 [0.84-1.53]	0.93 [0.74-1.17]
pre-college high school / university	21.0	58.3	26.9	4.6	10.2	1.01 [0.85-1.19]	1.04 [0.73-1.49]	0.89 [0.68-1.16]
Socioeconomic status								
income above average	44.1	56.9	28.2	4.8	10.2	1	1	1
average income	41.5	58.7	25.6	5.1	10.6	1.14 [0.99-1.30]	1.30 [0.98-1.73]	1.06 [0.86-1.31]
income below average	14.4	60.9	25.2	5.5	8.4	1.17 [0.97-1.41]	1.31 [0.90-1.90]	0.86 [0.63-1.17]
Living arrangement								
with parents	89.1	58.6	26.7	4.8	10.0	1	1	1
alone or with girlfriend	6.7	58.4	23.5	6.6	11.5	1.07 [0.83-1.39]	1.75 [1.10-2.79] *	1.24 [0.85-1.82]
shared flat, dorm, welfare institution	4.2	50.8	32.3	7.3	9.7	0.67 [0.50-0.90] **	1.35 [0.79-2.32]	0.82 [0.51-1.31]

AOR = Adjusted Odds Ratio. CI = Confidence Interval.
* = p ≤ .05; ** = p ≤ .01; *** = p ≤ .001
[a] Adjusted odds ratio from multinomial logistic regression comparing "Both negative" vs. "Both positive" vs. "DSM-5 only" vs. "DSM-IV only", using "Both positive" as reference category. Mutual adjustment for all sociodemographic variables presented in the table.

Table 5: Drinking correlates and substance use patterns in young Swiss men based upon their DSM-IV and DSM-5 diagnosis of alcohol use disorder (AUD) and DSM-IV and DSM-5 diagnostic subgroups

	All (n = 5,943)	Both negative (n = 3,464)	Both positive (n = 1,585)	DSM-5 Only (n = 296)	DSM-IV only (n = 598)	Both negative vs. Both positive	DSM-5 only vs. Both positive	DSM-IV only vs. Both positive
						AOR [95% CI] [a]	AOR [95% CI] [a]	AOR [95% CI] [a]
Mean age at 1st drink	14.37	14.73	13.76	14.31	14.00	1.30 [1.26-1.34] ***	1.14 [1.06-1.21] ***	1.05 [1.01-1.10] *
Mean age when first-time drunk	15.50	15.88	14.94	15.47	15.18	1.40 [1.35-1.46] ***	1.20 [1.11-1.30] ***	1.08 [1.02-1.14] **
Mean drinks on a typical occasion	4.02	3.04	5.75	5.52	4.78	0.80 [0.79-0.82] ***	0.99 [0.97-1.02]	0.93 [0.90-0.95] ***
Maximum drinks on any occasion [b]	12.22	9.79	16.35	14.80	12.30	0.89 [0.88-0.90] ***	0.98 [0.97-1.00] *	0.95 [0.93-0.96] ***
Drinking days per week	1.55	1.08	2.45	1.92	1.69	0.47 [0.44-0.49] ***	0.81 [0.75-0.88] ***	0.73 [0.68-0.78] ***
Mean of DSM-5 criteria	1.26	0.19	3.58	2.02	0.93	- [c]	- [c]	- [c]
Substance use over the past 12 months	Row-%	Row-%	Row-%	Row-%	Row-%			
No-risk consumption	53.8	77.8	10.5	3.1	8.6	1	1	1
At-risk RSOD or volume alcohol drinking	40.2	38.0	41.9	7.5	12.5	0.12 [0.10-0.14] ***	0.59 [0.45-0.79] ***	0.36 [0.29-0.44] ***
At-risk RSOD and volume alcohol drinking	6.0	18.8	69.7	4.5	7.0	0.04 [0.03-0.05] ***	0.21 [0.12-0.37] ***	0.12 [0.08-0.19] ***
No at-risk tobacco use	78.8	62.3	23.6	4.6	9.5	1	1	1
At-risk tobacco use (daily)	21.2	43.5	38.0	6.3	12.1	0.42 [0.36-0.48] ***	0.84 [0.63-1.12]	0.79 [0.63-0.98] *
No at-risk cannabis use	90.3	61.0	24.7	5.0	9.4	1	1	1
At-risk cannabis use (weekly)	9.7	33.5	44.9	5.2	16.4	0.30 [0.25-0.37] ***	0.54 [0.36-0.81] **	0.93 [0.72-1.22]
No use of illicit drugs	89.4	61.7	23.9	4.9	9.6	1	1	1
Use of illicit drugs	10.6	29.9	50.3	5.5	14.2	0.23 [0.19-0.28] ***	0.54 [0.37-0.78] **	0.69 [0.54-0.90] **

* = $p \leq .05$; ** = $p \leq .01$; *** = $p \leq .001$

[a] Adjusted odds ratio from multinomial logistic regression comparing "Both negative" vs. "Both positive" vs. "DSM-5 only" vs. "DSM-IV only", using "Both positive" as reference category. Adjusted for age, linguistic region, residence, education, socioeconomic status, and living arrangement.

[b] Winsorized at 40 drinks, which corresponded to the 98th percentile

[c] No regression was calculated since the sum of DSM-criteria is used to define the outcome categories ("Both negative" vs. "Both positive" vs. "DSM-5 only" vs. "DSM-IV only").

Supplementary material (on-line only) : Questionnaire of Diagnoses of alcohol use disorder (AUD) under the DSM-IV and DSM-5 classifications.

Questionnaire
In the past 12 months… • **Role impairment:** Has your drinking caused you to miss a class, work or also a scheduled activity at home with your family more than once? • **Hazardous use (**It was sufficient to meet this criterion if either of the two questions was reported**):** **1)** Have you on more than one occasion operated a car or other vehicle (such as a bicycle, motorcycle or moped) shortly after you had had several drinks of alcohol? **2)** Did you find yourself more than once in a situation that increased your chances of getting injured (using machines, walking or doing sport in a dangerous area or around heavy traffic) after you had been drinking too much alcohol? • **Legal problems:** Have you gotten into trouble with the police or an authority more than once because of your drinking? • **Social problems:** Have you continued to go back to alcohol even though your drinking had caused problems with a partner, friend or loved one? • **Tolerance to alcohol:** Did you find you needed a lot more alcohol to become high or drunk than you used to? • **Withdrawal:** Have you developed the shakes and nervousness that lasted for a full day or more after you cut down on your drinking? • **More or longer use:** Have you often found yourself drinking more and for longer periods of time than you intended? • **Quit/cut down:** Have you tried to cut down on your drinking, but couldn't? • **Much time spent:** Have you found yourself spending a great deal of time obtaining, using, or recovering from the effects of alcohol? • **Reduced activities:** Have you given up activities you care about (e.g. school, work or being with friends and family) because of your drinking? • **Continued drinking despite problems:** Have you continued to drink even though you were aware that alcohol had repeatedly caused you anxiety, depression or health problems? **Craving:** Have you had such a strong desire or urge to drink that you could not help drinking?

Diagnoses of alcohol use disorder (AUD) under the DSM-IV and DSM-5 classifications.	
DSM-IV AUD diagnosis	**DSM-5 AUD diagnosis**
Abuse criteria	**AUD criteria** (Abuse and dependence criteria combined)
• ***Role impairment***	• ***Role impairment***
• ***Hazardous use***	• ***Hazardous use***
• ***Legal problems***	• **-**
• ***Social problems***	• ***Social problems***
Dependence criteria	
• ***Tolerance***	• ***Tolerance***
• ***Withdrawal***	• ***Withdrawal***
• ***Longer or more use than intended***	• ***Longer or more use than intended***
• ***Unsuccessful attempts to quit/cut down***	• ***Unsuccessful attempts to quit/cut down***
• ***Much time spent using alcohol***	• ***Much time spent using alcohol***
• ***Reduced activities because of drinking***	• ***Reduced activities because of drinking***
• ***Continued drinking despite psychological or physical problems***	• ***Continued drinking despite psychological or physical problems***
• **-**	• ***Alcohol craving***
Alcohol abuse: 1+ abuse criteria required	**Moderate AUD: 2-3 criteria required**
Alcohol dependence: 3+ dependence criteria required	**Severe AUD: 4+ criteria required**
Any AUD: Abuse or dependence required	**Any AUD: 2+ criteria required**
[a] Two distinct but hierarchical constructs (DSM-IV) vs one single disorder, with distinction in severity of AUD diagnoses on the basis of number of satisfied criteria.	